

APPENDIX E: AT&T TRUEVISION IMAGE FILE FORMATS

This section defines the file formats recommended for storing images for the AT&T Truevision Image Capture Board, the AT&T Truevision Video Display Adapter (VDA), the AT&T Truevision Video Display Adapter with Digital Enhancement (VDA/D), and the Truevision Advanced Raster Graphics Adapter (TARGA) family. These formats should be used by all software developed for the Truevision product family. This standard is recommended since it allows software products to be compatible with our telecommunications and imaging software.

All VDA/D programs should be able to interpret Data Types 1 and 9. ICB and TARGA programs should be able to interpret Data Types 2 and 10. Applications should use other formats when they are required for their applications.

The AT&T Electronic Photography and Imaging Center has currently defined nine types of data files. Additional file types will be defined as new applications develop. You may request a current catalog of file formats by writing us.

The codes designating the nine file formats are:

Data Type (Field 3)	Description
0	No Image Data Included
1	Uncompressed, Color-Mapped (VDA/D) Images
2	Uncompressed, RGB Images (e.g., ICB, TARGA 16, TARGA 24, TARGA 32)
3	Uncompressed, Black and White images (e.g., TARGA 8)
9	Run-Length Encoded Color-Mapped (VDA/D) Images
10	Run-Length Encoded RGB (ICB, TARGA 16, TARGA 24, TARGA 32) Images
32	Compressed Color-Mapped (VDA/D) Data using Huffman, Delta, and Run-Length Encoding
33	Compressed Color-Mapped (VDA/D) Data using Huffman, Delta, and Run-Length Encoding. Data encoded for presentation in 4 passes.
34	Compressed Color-Mapped (VDA/D) Data using Huffman, Delta, and Run-Length Encoding. A fixed Huffman map is used.
35	Compressed Color-Mapped (VDA/D) Data using Huffman, Delta, and Run-Length Encoding. A fixed Huffman map is used. The data encoded for presentation in 4 passes.

Data type codes 0 to 127 (Field 3) are reserved for use by AT&T's Electronic Photography and Imaging Center for general applications. Data types 128 to 255 may be used for user-specific applications. Similarly, the first 128 map type codes (Field 2) are reserved and the second set of 128 map type codes (128 to 255) may be used for user-specific applications.

The remainder of this appendix contains detailed descriptions of each of these file formats. Each description includes a discussion of applications and average file sizes as well as a detailed definition of the file format.

Naming Conventions:

This specification only defines the structure of the data within a file. You can store images using any name and suffix that you want. However, the demonstration software and the programs in the Truevision software series use the suffixes, vda, icb, and tga, for VDA/D, ICB, and TARGA images. You must specify a suffix for image files.

E.2 DATA TYPE 2: RGB (UNMAPPED) IMAGE DATA

Application: This data type is used for storing raster images where each pixel is represented by its red, green, and blue values (e.g., ICB and TARGA 16 images). However, for the ICB, each full-screen image requires 100K bytes of storage. This format is useful where storage and display time are critical and where file size is not.

This file format is used by the demonstration programs distributed with the ICB.

File Size: Each image requires 100K bytes of disk storage for the ICB and 400K bytes of disk space for the TARGA 16.

File Format:

Field 1 *Number of Characters in Identification Field (1 Byte):*
See Field 1 for Data Type 1.

Field 2 *Color Map Type (1 Byte):*
This value is always 0 for RGB images.

Field 3 *Image Type Code (1 Byte):*
This value is 2 for this data type.

Field 4 *Color Map Specification (5 bytes):*
Ignored but full five-byte field must be present.

Field 5 *Image Specification: (10 Bytes):*

Field 5.1 *X-Origin of Image (2 Bytes):* Fields 5.1 and 5.2 specify the lower left corner of the image.

Field 5.2 *Y-Origin of Image (2 Bytes):* See previous subfield.

Field 5.3 *Width of Image (2 Bytes):* Width of the image in pixels. (512)

Field 5.4 *Height of Image (2 Bytes):* Height of the image in pixels.

Field 5.5 *Image Pixel Size (1 Byte):* Number of bits in a pixel. For the ICB and TARGA 16, this is 15 or 16 bits.

Field 5.6 *Image Descriptor Byte (1 Byte):*

Bits 3-0 Number of Attribute Bits associated with each pixel. For the ICB, this would be 0 or 1.

Bit 4 Reserved.

Bit 5 Screen Origin Bit:

0 - Origin in Lower Left-Hand Corner

1 - Origin in Upper Left-Hand Corner

Bits 7-6 Data Storage Interleaving Flag:

00 - Non-Interleaved (e.g., VDA/D and ICB)

01 - Two-Way (Even-Odd) Interleaving (e.g., IBM Color Graphic Adapter)

10 - Four-Way Interleaving (e.g., High-Resolution AT&T PC)

11 - Reserved.

For the ICB, this byte should be 0 or 1.

Field 6 *Image Identification Field (Variable):*
See Field 6 for Data Type 1.

Field 7 *Color Map Data (0-Bytes):*

For RGB data, this field must be empty.

Field 8

Image Data Field (Variable):

This field specifies (Width)x(Height) pixels. Each pixel specifies an RGB color value. The values for Width and Height are specified in Fields 5.3 and 5.4 respectively.

The RGB specification for each color map entry is stored in successive bit-fields in the multi-byte entries. Each color bit-field is assumed to be:

$$\text{Field Bit Length} = ((\text{Field 5.5}) - (\text{Bit 3-0 of Field 5.8}))/3 \text{ bits}$$

Unused bit(s) in the multi-byte entries are assumed to specify attribute bits.

For the ICB, each pixel must be stored as two bytes. Each two-byte color value is composed of the following four fields:

Bits 4- 0	Blue Intensity
Bits 9- 5	Green Intensity
Bits 14- 10	Red Intensity
Bit 15	Overlay Bit

All fields are assumed to be unsigned. The low-order byte of two-byte fields is stored first.

